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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/052,024	01/18/2002	Dawn A. Bonnell	UPN-4110	1230

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EXAMINER	
BENSON, WALTER	
ART UNIT	**PAPER NUMBER**
2858	

DATE MAILED: 12/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/052,024	BONNELL ET AL.	
	Examiner	Art Unit	
	Walter Benson	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *election filed 9/17/03*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *1-7 and 20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8,9,13 and 15* is/are rejected.

7)☒ Claim(s) *10-12,14 and 16-19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of claims 8-19 in Paper No. 8 is acknowledged. The traversal is on the ground(s) that claims 1-19 are amenable to be examined without imposing serious burden by the examiner. This is not found persuasive because a generic claim in a species requirement does not require examination of all claims that dependent on the generic claim. Only those claims directed to the elected species will be examined.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 1-7 and 20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 8.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 8, 9, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hellemans et al. (US Patent No. 6,201,401 B1 and Hellemans hereinafter) in view of Adderton et al. (US Patent No. 6,530,266 B1 and Adderton hereinafter).

5. As to claim 8, Hellemans discloses a method for determining impedance information of an interface in a sample substantially as claimed, the method comprising:

applying an ac voltage to the sample, laterally across the interface, the ac voltage having a predetermined frequency (col. 7, lines 25-28 and col. 9, lines 20-24);

disposing a cantilevered tip in a first position proximate to a surface of the sample (12, Fig. 4; col. 7, lines 49-54);

measuring a first response of the cantilevered tip with the cantilevered tip in the first position (col. 7, lines 54-58);

placing the cantilevered tip in a second position proximate to the surface of the sample, the interface being between the first position and the second position (col. 8, lines 1-9;

measuring a second response of the cantilevered tip with the cantilevered tip in the second position (Fig. 5; col. 8, lines 10-13);

Hellemans did not expressly disclose:

determining impedance information of the interface based upon the measured first response and the measured second response.

Nonetheless, these features are well known in the art and would have been an obvious modification of the system disclosed by Hellemans, as evidenced by Adderton.

In an analogous art, Adderton discloses an active probe for an Atomic Force Microscope having:

determining impedance information of the interface based upon the measured first response and the measured second response (col. 8, lines 59-67).

Given the teaching of Adderton, a person having ordinary skill in the art at the time of the invention would have readily recognized the desirability and advantages of modifying Hellemans by employing the well known or conventional features of image and position topography measurements, such as disclosed by Adderton, in order to detect changes in the oscillation amplitude of the cantilever tip indicative of a particular surface topography.

6. As to claims 9, 13, and 15, Adderton discloses a method for determining impedance information of an interface in a sample, the method comprising:

measuring a first response comprises measuring a first phase angle of deflection of the cantilevered tip (col. 11, lines 59-67);

measuring a second response comprises measuring a second phase angle of deflection of the cantilevered tip (col. 11, lines 63-67);

determining impedance information comprises: determining a phase shift based upon the first phase angle and the second phase angle (col. 12, lines 47-49);

determining impedance information of the interface based upon the phase shift and the frequency of the ac voltage (col. 11, lines 56-62).

Given the teaching of Adderton, a person having ordinary skill in the art at the time of the invention would have readily recognized the desirability and advantages of modifying Hellemans

by employing the well known or conventional features of image and position topography measurements, such as disclosed by Adderton, in order to realize high quality images at fast imaging speeds for a particular surface topography.

Allowable Subject Matter

7. Claims 10-12, 14, and 16-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record fails to teach or suggest individually or in combination and a device and method for topographic processes where the step of determining impedance information further comprises determining an impedance product of the interface according to:

$$\tan(\varphi_{gb}) = \frac{\omega C_{gb} R_{gb}^2}{(R + R_{gb}) + R\omega^2 C_{gb}^2 R_{gb}^2}$$

where Cgb is the capacitance of the interface;

Rab is the resistance of the interface;

ω is the frequency of the ac voltage;

φ_{gb} is the phase shift;

R is a resistance of a current limiting resistor in series with the sample.

Prior Art Made of Record

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure

A. Jackson (US 2002/0021139) discloses a method and apparatus for measuring an electrical characteristic on a molecular scale;

B. Ho et al. (US Patent No. 5,847,569) discloses a method and apparatus for measuring at least one parameter of material with sub-micron spatial resolution.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter Benson whose telephone number is (703) 306-4525. The examiner can normally be reached on Mon to Fri 6:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on (703) 308-0750. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

Walter Benson WB
Patent Examiner
November 25, 2003

N. Le
Supervisory Patent Examiner
Technology Center 2800